Monte Carlo Simulation for Portfolio Optimization

**Description**: This Python project demonstrates advanced portfolio optimization using Monte Carlo Simulation, aligning with strategic financial decision-making skills essential for roles like Tesla's FP&A position. Over 10 years of monthly stock return data for 10 companies are imported and analyzed using Python libraries like pandas, NumPy, matplotlib, seaborn, and yfinance. Key features include:

1. **Data Cleaning and Analysis**: Implemented efficient data parsing and cleaning to handle real-world financial data, focusing on Adjusted Close Values and eliminating nulls for accuracy.
2. **Return & Risk Assessment**: Calculated individual stock returns, standard deviations, and variance-covariance matrices, essential for understanding market dynamics.
3. **Monte Carlo Simulation**: Performed a 10,000-portfolio simulation, considering each stock's performance to determine optimal portfolio allocation. This involved calculating expected returns, standard deviation, Sharpe ratio, and variance.
4. **Risk-Free Rate Integration**: Adapted the model to include a risk-free rate, providing insights into the impact of risk-free investments on portfolio performance.
5. **Data Visualization**: Utilized seaborn for effective visualization of simulation results, comparing scenarios with and without a risk-free rate.

In conclusion, this project showcases expertise in financial modeling, data analytics, and the practical application of Python in financial analysis, reflecting skills relevant to focus on data-driven financial planning and analysis.